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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/300,363 04/26/99 IRELAND

F 11675.99.1

022901
JESUS JUANOS I TIMONEDA
1000 EAGLE GATE TOWER
60 EAST SOUTH TEMPLE
SALT LAKE CITY UT 84111

MM91/1002

EXAMINER

WARREN, M

ART UNIT

PAPER NUMBER

2815

DATE MAILED:

10/02/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary

Application No.

09/300,363

Applicant(s)

IRELAND ET AL.

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

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DETAILED ACTION

This Office Action is in response to the RCE filed on August 29, 2001.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The amended claims include the limitation of the sleeve insulator having a first and second terminus. Although it is understood that limitations are meant to convey that the sleeve insulator terminates at certain points in the device, the specification does not adequately describe or mention the first and second terminus or where the sleeve insulator terminates.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application

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by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-6, 8-10, and 12-21, as far as understood, are rejected under 35

U.S.C. 102(e) as being clearly anticipated by Lee et al. (US 6,165,839).

Claims 1-6, 8-10, and 13-18, as far as understood, are rejected under 35

U.S.C. 102(e) as being anticipated by Gardner (US 5,973,910).

Gardner discloses (fig. 2) a contact structure for a semiconductor device. The structure comprises a lower bulk insulator (101) formed on a substrate 100. A conductor layer (104) is situated above the insulator layer. A dielectric layer (103) is formed over the bulk insulator and under the conductor layer. A sleeve insulator layer (107) is in contact with a sidewall of the conductor layer, the bulk insulator layer and the dielectric layer. A conductor structure (108) extends from the sleeve insulator layer to terminate at a contact on the substrate. The conductor structure extends beyond and is insulated from the conductor layer by the sleeve insulator (107). An electrically insulating layer (105) is formed on the conductor layer.

Claims 19-21, as far as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (US 5,475,247).

Kim et al. shows (fig. 3) a contact structure for an integrated circuit comprising a substrate (1), active regions (3), a capacitor storage node (col. 4, lines 14-19) in contact with the active regions, a capacitor dielectric (7), and a capacitor cell plate (8). An electrically conductive plug (12) is in contact with the active region and the storage

node. A first dielectric layer (15') insulates the capacitor cell plate from the electrically conductive plug. The plug projects from the active region above the first dielectric layer and the capacitor cell plate. The device includes a first and second transistor situated upon the substrate. A first portion of the plug is between the two transistors and between the substrate and the first dielectric layer. The storage node is also in contact with an insulated spacer on each of the two transistors.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11 and 12, as far as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US 5,973,910) as applied to claim 1 above, and further in view of Dennison et al. (US 5,338,700) and Ohsaki (US 6,198,143 B1).

Gardner shows all of the elements of the claims except the material used for the sleeve insulator and the refractory metal silicide on the active area. Dennison shows (fig. 9b) an embodiment of a contact structure which has a sleeve insulator portion (92) which terminates in an upper portion of a lower bulk insulator layer (28). The sleeve insulator is made of a nitride (includes SiN) (col. 6, lines 59-68). Ohsaki shows (fig 1) a contact structure for a semiconductor device in which a conductive plug (11) is in contact with a refractory metal silicide (6). The silicide is formed on active region (5) of

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the device to reduce the contact resistance (col. 1, lines 19-63). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the contact structure of Gardner with a nitride because Dennison discloses that nitride is a suitable material for insulating a contact structure. It would have also been obvious to modify the contact structure of Gardner with a refractory metal silicide because Ohsaki teaches that refractory metal silicides are desirable materials for lowering the contact resistance of a device.

Claims 22-25, as far as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,165,839) in view of Ohsaki (US 6,198,143 B1).

Lee et al. shows (fig. 15) a contact structure comprising a lower bulk insulator layer (9) situated above a substrate (1), a dielectric layer (10) above the bulk insulator, a conductor layer (20a) above the dielectric layer, and a sleeve insulator layer (26) of SiN which extends through and is in contact with the bulk insulator and the conductor layer. The sleeve insulator layer is also in contact with the dielectric layer and extends within the lower bulk insulator to terminate above the substrate. An electrically insulating layer (21) is formed conformably upon the conductor layer and has a sidewall in contact with the sleeve insulator. A conductor structure (24) is insulated from the conductor layer by the sleeve insulator. The conductor structure extends from the sleeve insulator to make contact with a material (22) that does not conduct electricity. Lee shows all of the elements in the claims except the refractory metal silicide contact on the substrate. Ohsaki shows (fig 1) a contact structure for a semiconductor device in which a conductive plug (11) is in contact with a refractory metal silicide (6). The silicide is

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formed on active region (5) of the device to reduce the contact resistance (col. 1, lines 19-63). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the contact structure of Lee with a refractory metal silicide because Ohsaki teaches that refractory metal silicides are desirable materials for lowering the contact resistance of a device.

Response to Arguments

Applicant's arguments with respect to claims 1-6 and 8-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (703) 305-0760. The examiner can normally be reached on Mon-Thurs, and alternating Fri, 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MEW

MEW

September 29, 2001



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800